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10/677,545	10/02/2003	Eric Chao Xu	ANDRPR/385/US	9559

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ALIX YALE & RISTAS LLP
750 MAIN STREET
SUITE 1400
HARTFORD, CT 06103

EXAMINER	
CORDRAY, DENNIS R	
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1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/677,545	XU, ERIC CHAO	
	Examiner	Art Unit	
	DENNIS CORDRAY	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16,18-23,28-34,36-38 and 42-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16,18-23,28-34,36-38 and 42-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 12/3/2007 have been fully considered but they are not persuasive.

Applicant argues on p 13 that the Examiner is applying hindsight to construct the rejection from three disparate references. As indicated in a previous Office Action, "It should be too well settled now to require citation or discussion that the test for combining references is not what the individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper." In re McLaughlin, 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971).

Applicant argues on p 15 that there is no nexus of teachings, suggestions or motivations between the references, but that the rejection relies upon general knowledge to combine them.

Applicant admits on pp 15-16 that NaOH alkaline peroxide (NaOH AP) pretreatment is known, and that it is also known to introduce AP in the refiner feed train, at or after the refiner, but argues that combining the pretreatment with AP introduced at the refiner or in the blowline immediately following the refiner is not known. Applicant

also argues that nothing of record provides motivation to optimize the distribution and total quantity of NaOH AP between pretreatment and blowline.

Applicant argues on pp 14-16 that Haynes et al does not suggest addition of bleaching chemicals immediately after the refiner in the blow line before further processing, followed by a high consistency bleaching tower, that Haynes et al does not disclose the claimed AP pretreatment, and that Haynes et al uses an alkali that differs from NaOH, thus is trying to eliminate NaOH from the refiner.

Applicant argues on p 16 that Cannell does not teach introduction of the bleaching chemicals at the blow line just after the refiner. Further, Cannell only suggests peroxide added at the second location, not NaOH AP. Applicant further argues on p 17 that Cannell implies in the last paragraph of the Technology Update that, in the APP process, the front end needs a high loading of AP.

Applicant argues on pp 15-16 that Prusas removes AP after the first stage treatment but does not remove the sulfite liquor, and that there is no thought of carrying over any AP from pretreatment to refining, thus Prusas is trying to eliminate NaOH from the refiner.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Many of the arguments have been previously discussed, but a summary will be included herein for completeness.

Regarding the disclosure of Haynes et al, an alkaline peroxide treatment of the pulp in the refiner or prior to the refiner is disclosed (col 12, lines 39-42, Fig. 2, items 260, 261 and 263). A suitable substitute alkali for sodium hydroxide is magnesium hydroxide which can be in any amount greater than 0% to 100% of what would be a suitable quantity of sodium hydroxide, preferably between about 40% to 100%…" (col 6, lines 26-43), thus a NaOH AP treatment is disclosed.

In Figure 2, Haynes et al discloses addition of the alkaline peroxide at vessels, cyclone cleaner, conveyors (Fig 2, blocks 218, 258, 226, 230) and all lines connected to such blocks, including after the primary refiner and prior to additional refining (Fig 2, item 262) (col 12, lines 42-62). Haynes et al discloses similar points for addition of the bleaching chemicals in Figure 3, such as at cyclone block 328 and all lines into or leaving the block (col 13, lines 48-64). The instant Specification fails to provide examples of any unexpected benefits achieved from introducing the chemicals immediately after the blow valve. Absent convincing evidence of unexpected advantages derived from introducing the chemicals immediately after the blow valve, the claimed introduction point is considered by the Examiner to have been obvious over the disclosure of Haynes as a functionally equivalent option.

Regarding the disclosure of Prusas, in one embodiment specifically recited the chips are simply allowed to drain from the impregnation, thus some of the alkaline liquor remains impregnated in the pulp. A reference is not limited to its preferred embodiment,

but must be evaluated for all of its teachings, including its teachings of non-preferred embodiments. In re Burckel, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979). Furthermore, "[t]he prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed…." In re Fulton, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

Cannell et al was used to provide a general teaching of a typical BCTMP process generally known to those of ordinary skill in the art comprising multiple DTPA and alkaline peroxide impregnations prior to the main refining step as well as bleaching following the main refining step and prior to any other process steps. In the last paragraph of the Technology Update, Cannell suggests that a high loading of AP in the front end needs may offset savings due to higher chemical costs, thereby teaching one of ordinary skill in the art that optimization may be required of the split between impregnation and post-bleaching stages.

Cannell et al thus serves as a nexus connecting the disclosure of Haynes et al with that of Prusas. Haynes et al discloses alkaline peroxide treatment of the pulp prior to the refiner but provides no details of the treatment. Cannell et al teaches multiple alkaline peroxide impregnations prior to the main refining step as well as bleaching following the main refining step and prior to any other process steps. Prusas teaches the details of the multiple alkaline peroxide impregnations. All claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the

combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

The amount of bleaching chemical used in a given bleaching step affects the brightness of the pulp, thus is a result effective variable (see Villaume et al, 4040743, col 1, lines 19-24 if evidence is needed). Optimizing the amounts of NaOH AP used in a bleaching step, or between two or more bleaching steps, to achieve a desired whiteness of brightness of the pulp, would have been within the capabilities of one of ordinary skill in the art through routine experimentation.

The rejections are maintained and have been modified to include the newly added claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-11, 18-23, 28-29, 36-38 and 42-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haynes et al (U 6,743,332) in view of Cannell et al ("The Future of BCTMP", Pulp and Paper, May 2000, supplied by applicant) and further in view of Prusas (4,486,267).

Claims 1-4, 8, 18-19, 22-23, 28, 36-37 and 42-43: Haynes et al discloses a method of making bleached mechanical pulps comprising (Abs; col. 5, lines 36-46; col

11, lines 53-64; col 12, lines 1-12; Fig. 2, item 224; col 13, lines 31-36; col 14, line 45 to col 15, line 8, Example 1):

- feeding wood chips, or lignocellulosic material, into a pressure disk refiner (inherently or obviously at an inlet to the refiner);
- refining the pulp at a temperature between 85 and 160 °C at a pressure of about 11 to 40 psi (68.9 to 276 kPa);
- the pulp having a consistency of about 10% to 50%; and
- delivering a stream of refined (primary) pulp from the casing of the refiner to a blow line while the primary pulp temperature is between 85 and 160 °C.

The pressure refiner has a superatmospheric casing to allow operation at elevated pressures. The feed is in the form of wood chips, thus has been previously refined. Multiple alkaline peroxide treatments of the pulp are disclosed, including treatment in the refiner or prior to the refiner (col 12, lines 39-53, Fig. 2, items 260, 261 and 263). In addition, a second alkaline peroxide (intermediate or blow line) solution is mixed with the stream of primary pulp within the intermediate (blow) line while the primary pulp temperature is between 85 and 160 °C (col. 5, lines 12-20 and 36-45; col. 8, lines 10-14, Fig. 2, item 262; col. 12, lines 49-53; col 15, lines 8-10, Example 1) to form a reaction mixture in the intermediate line (col. 5, lines 41-45). Haynes also discloses that the second addition of the alkaline peroxide (intermediate or blow line) solution can be added at vessels, cyclone cleaner, conveyors (Fig 2, blocks 218, 258, 226, 230) and all lines connected to such blocks, including after the primary refiner (blow line) and prior to additional refining (Fig 2, item 262) (col 12, lines 42-62). The

components of the bleaching liquor, including the alkaline component can be added concurrently or together as part of the bleaching liquor (col 5, lines 6-12). An inlet port is inherent or, at least, would have been obvious to one of ordinary skill in the art to allow for the addition of treatments. Including a blow valve for discharging the solution from the pressurized refiner into the blow line is also inherent or would also have been obvious. In some embodiments, the reacting mixture having a temperature between 85 and 160 °C is discharged into a retention vessel, such as a surge vessel or a further portion of the blow line after the addition and mixing, (col. 8, lines 10-14) and contact time in the lines and vessels is controlled (the reaction mixture is retained) to produce a bleached material (col 5, lines 12-20; col. 13, line 64 - col. 14, line 8).

Haynes et al does not disclose the following:

- Feeding a lignocellulosic material into a first press,
- Pressing the lignocellulosic material,
- Discharging the material from the first press,
- Impregnating the material with a sodium hydroxide alkaline peroxide solution and maintaining the impregnation for a reaction time.

Cannell et al teaches a typical BCTMP (bleached chemical thermomechanical pulp) flow process (Fig 2, bottom of page 9 of provided article) that includes a multistage impregnation with an aqueous solution of DTPA, hydrogen peroxide and caustic, a primary refining stage, and a bleaching stage following the primary refining stage prior to any other process stages. Cannell thus teaches that pre-refining

treatment with caustic and peroxide as well as post refining bleaching are typical steps practiced in the art.

Prusas discloses an alkaline peroxide mechanical pulping process comprising the steps of pretreating a lignocellulosic material by feeding a lignocellulosic material into a first press (col. 5, lines 5-12), pressing the lignocellulosic material (col. 5, lines 13-19); discharging the lignocellulosic material from the first press (col. 5, lines 13-19), impregnating the lignocellulosic material discharged from the first press with a first alkaline peroxide pretreatment solution (col. 5, lines 20-44) and maintaining the impregnation for a first reaction time (col. 5, line 65 - col. 6, line 7). Impregnation of lignocellulosic material by pressing and then allowing an impregnating solution to be drawn into the material upon release of pressure in the manner disclosed by Prusas is generally known in the art.

The art of Haynes et al, Cannell et al, Prusas and the instant invention is analogous as pertaining to the art of producing bleached CTMP pulps. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to pretreat the lignocellulosic material by impregnation with an alkaline peroxide solution using the claimed steps in the pulping process of Haynes et al in view of Cannell et al and further in view of Prusas as a generally known treatment of lignocellulosic material. Including a multistage impregnation pretreatment of the lignocellulosic material would have been obvious as a typical process sequence, as taught by Cannell et al. Using the same sequence of steps for the second impregnation as for the first would also have been obvious as a generally known process.

Claim 5: Haynes et al discloses that the step of mixing (Fig. 3, item 336) is immediately followed by introducing the mixture into a separator (Fig. 3, item 338) and the separated pulp is then discharged into a retention vessel (Fig. 3, item 348).

Claim 6-7, 20-21 and 38: Haynes et al is not specific as to where in the blow line the alkaline peroxide treatment is added, but discloses addition of bleaching chemicals in the lines (Fig 2, 262) between the first refiner and process equipment following the first refiner. Absent data showing special properties derived from a particular point of addition in the blow line as compared to other locations in the line, it would have been obvious to one of ordinary skill in the art to add the treatment at any location within the line, including near the blow valve or cyclone separator, as a functionally equivalent option.

Claims 9 and 10: Haynes et al does not disclose altering the temperature or consistency of the mixed pulp and alkaline peroxide. Absent data showing special properties derived from a particular temperatures and consistencies, it would have been obvious to one of ordinary skill in the art to maintain the temperature and consistency achieved in the refining for further refining or processing.

Claims 11 and 29: Haynes et al discloses that the bleaching liquor comprises chelating agents and/or silicates to stabilize the peroxide (col 9, line 56 to col 10, line 11). Keeping the peroxide solution at lower temperatures prior to treating the pulp would have been obvious to minimize the peroxide decomposition reactions.

Claims 44-49 and 51-52: Haynes et al, Prusas and Cannell et al do not disclose the relative amounts of sodium hydroxide alkaline peroxide solution added prior to

refining versus post refining. The amount of bleaching chemical added to a pulp is a known result-effective variable related to the whiteness of the pulp. It would have been obvious to one of ordinary skill in the art at the time of the invention to determine, through routine experimentation, the optimum amounts of bleaching chemicals added at the various points in the process to obtain the desired whiteness and to obtain the claimed amounts. Alternatively, it would have been obvious to add similar amounts of bleaching liquor at each addition point before, during and after the refining step.

Claim 50: Haynes discloses that the pulp discharged from the refiner comprises steam that is separated in the separator, which separates the steam from the pulp mixture (col 12, lines 5-14; col 13, lines 41-48). In Figure 2, the separator is block 218 and, in Figure 3, a two stage separator and pressure reducer is disclosed in blocks 328, 332 and 338. At least some of the separated pulp is moved by a conveyor to be retained in a vessel (Fig. 2, block 226, a surge vessel for rejected pulp; Fig. 3, block 348, a bleach vessel). Alternatively, as discussed above, contact time in the lines and vessels is controlled (the reaction mixture is retained) to produce a bleached material. The pulp in the bleach vessel can remain at the same temperature as at the exit from the cyclone (col 14, lines 3-4), which is at atmospheric pressure. Since the two stage separation and pressure reduction in Figure 3 separates steam from the process and the final pressure is atmospheric, it would have been obvious to maintain a pulp temperature below 100 °C to avoid further steam production and changing consistency of the pulp. Similar conditions in the other lines and vessels immediately following the

separator would have been obvious. No change in consistency is disclosed, thus the pulp in the retention vessel remains at about 10% to 50%.

Claims 12-16 and 30-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haynes et al, Prusas, and Cannell et al, as applied to claims 1-2 and 21-22 above, and further in view of Textor (3,023,140), Sandstrom et al (4,270,976), and Xu (Xu, Eric C., "Chemical Treatment in Mechanical Pulping - Part 3; Pulp Yield and Chemical Pretreatment", 1998 Pulping Conference, TAPPI Proceedings, pp. 391-402, supplied by applicant).

The transition term "contains" is open-ended and must include at least the amounts of the reagents recited, but does not preclude other reagents or larger amounts of reagent. Therefore, the Examiner has considered the amounts claimed to indicate a lower end of a range of concentrations for each reagent.

Claims 12-16: Haynes et al discloses an acceptable alkalinity to hydrogen peroxide ratio in the bleaching liquor of about 0.25 to about 3 on a weight basis (col. 7, lines 2-4). The alkalinity limitation endpoints of claims 12-16 all fall within this range. Haynes also discloses adding a chelating agent, such as DTPA, in an amount of up to 10% by weight (col. 7, lines 7-18), which encompasses the claimed limitation endpoints of claims 12-16. Haynes further discloses use of sodium silicate up to about 10% by weight (col. 7, lines 32-33), which encompasses the limitation endpoints of claims 12-16. Additionally, Haynes et al discloses a suitable amount of hydrogen peroxide is 0.45% by weight to 9% by weight (10 to about 200 pounds per ton) based on dry pulp

(col. 6, lines 62-64), which encompasses the limitation endpoints for claims 12-16, and also discloses a residual peroxide level of greater than 0.7% (col. 10, line 67 to col. 11, line 2), which also encompasses the limitation endpoints for claims 12-16.

Haynes et al does not disclose expressly the use of magnesium sulfate or residual alkalinity in the impregnating solution.

Textor discloses an alkaline peroxide mechanical pulping process (col. 3, line 73 to col. 4, line 1) in which magnesium sulfate is used to stabilize the peroxide bleach liquor (col. 3, lines 8-9). Textor discloses expressly a concentration of .05% magnesium sulfate (col. 3, lines 4-6), which contains one specific point within the claimed range of the 1st impregnation solutions of claims 14, 15, and 16, and within the 2nd impregnation fluids of claims 15 and 16.

Sandstrom et al discloses an alkaline peroxide mechanical pulping process (col. 1, lines 9-20) in which magnesium sulfate is added to the bleach liquor in an amount of 0.1 to 0.5% of the dry lignocellulosic material (col. 3, lines 4-13), which encompasses the claimed limitation endpoints of the second impregnation solutions of claims 12 and 13, and the intermediate line solutions of claims 12, 13, and 14. The range disclosed by Sandstrom et al also contains two specific points within the claimed ranges of claim 14, Ist and 2nd impregnation solutions, claim 15, 1st and 2nd impregnation solutions and intermediate line solution, and claim 16, 1st and 2nd impregnation solutions.

Xu discloses a total alkalinity residual of 0.1% in a 1st impregnation stage and 1.3% in a 2nd impregnation stage (p. 397, Table II, rows 4 and 7), and a total "total

alkalinity" residual of up to 3.1 (p. 398, Table III, row 17), which contains at least one specific point within the claimed ranges of claims 12-15, intermediate line solutions.

The art of Haynes et al, Prusas, Cannell et al, Textor, Sandstrom et al, Xu and the instant invention is analogous as pertaining to the art of producing bleached CTMP pulps. Absent data showing special properties derived from the particular claimed compositions as compared to broader disclosures in the prior art, it would have been obvious to one of ordinary skill in the art to use magnesium sulfate as described by Textor and Sandstrom et al as a functionally equivalent option and to optimize the amount of magnesium sulfate to obtain the most efficient use of the reagent as a stabilizer for the peroxide solution (Textor, col. 3, lines 8-9). The amount of peroxide is a known result effective variable and it would have been within the capability of one of ordinary skill in the art to optimize the concentration of peroxide, and thereby the sodium hydroxide and stabilizer, in the bleaching liquors to provide the greatest whitening effect. Obtaining the claimed residual alkaline and peroxide would also result from the optimization.

Claims 30-34 are treated similarly to Claims 12-16.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DENNIS CORDRAY whose telephone number is (571)272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dennis Cordray/
Examiner, Art Unit 1791

/Eric Hug/
Primary Examiner